

# Otter Creek Iron TMDL Public Meeting

October 2015

10/21 – Miles City

10/22 – Billings



## Otter Creek Iron Total Maximum Daily Load – Draft



October 2015

*Steve Bullock, Governor*  
*Tom Livers, Director DEQ*



Document Number Y16-TMDL-01aD

# Meeting Purpose

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Public meeting to present results of an evaluation of iron concentrations in Otter Creek

Answer questions about the resulting draft TMDL document that is currently available for public comment



Otter Creek

# Presentation Outline

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- Montana's Water Classifications, Designated Beneficial Uses, and Water Quality Standards
- Purpose of Iron Project & Project Results
- TMDL Definition & TMDL Process
- Otter Creek Iron TMDL Development
- Public Comment Period Info & Next Steps

# Context: Water Use Classification



Different ecosystems and stream types are suitable for different uses and classified in different categories



# Context: Montana Water Quality Standards

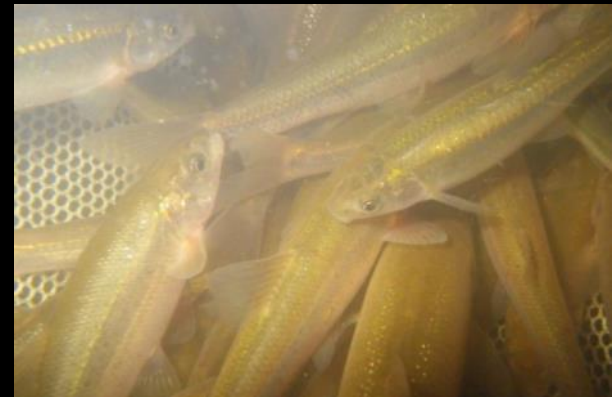
- Numeric (number) or Narrative (descriptive)
- Protect designated uses such as Agriculture & Aquatic Life
- Classifications are based on designated uses



Agriculture:  
Irrigation



Agriculture: Livestock  
Water Supply



Aquatic Life:  
Warmwater Fish

# How Do We Apply the Standards?

- Standards apply the entire length of a stream or entire area of a lake
- DEQ collects representative water quality information to determine if the standards are being met
- When standards are not being met for a pollutant, DEQ develops a TMDL as required by state and federal law

**Montana Code Annotated 2015**

**TITLE 75. ENVIRONMENTAL PROTECTION  
CHAPTER 5. WATER QUALITY**

**Part 7. Water Quality Assessment**

# Types of Pollutant Concerns in Eastern Montana

**METALS**



**NUTRIENTS**



**SEDIMENT**



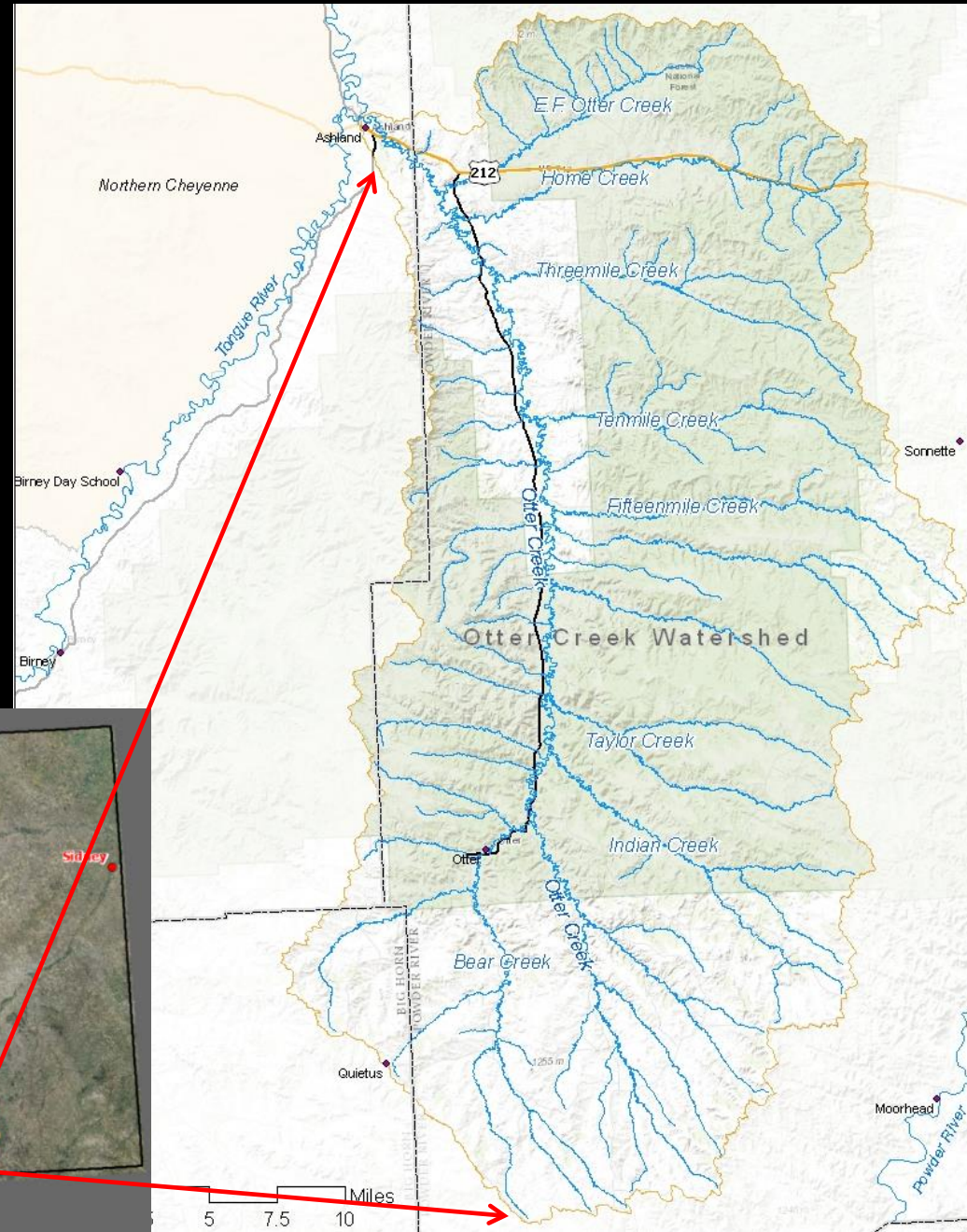
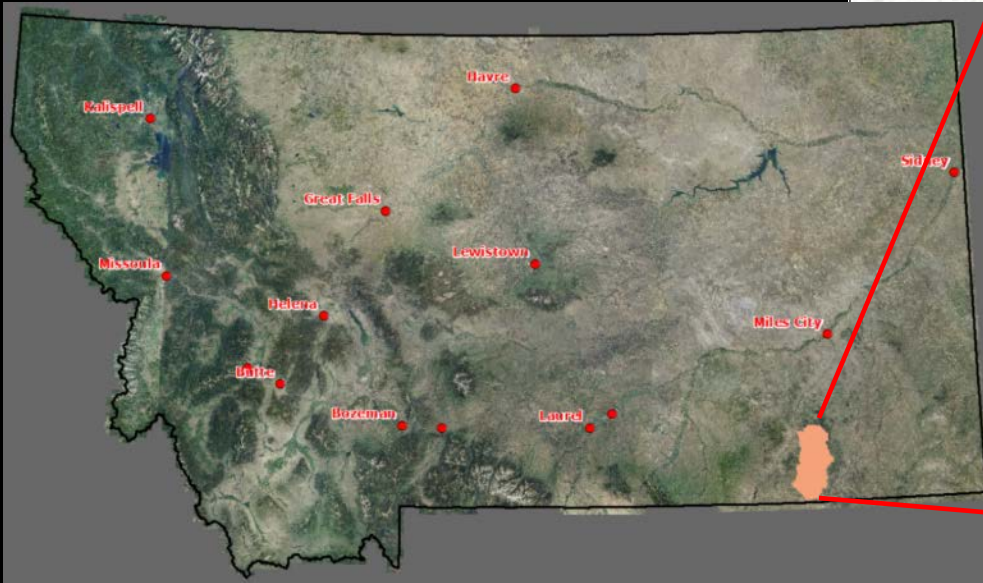
**SALINITY**





# Project Area

## Otter Creek Watershed





# Purpose of Project

- Address a high priority based on proposed discharge permit for new coal mine
- Evaluate the health of Otter Creek in relation to iron concentrations in the stream
- Provide information that will help protect water quality in Otter Creek, as it relates to iron



# Project Results

- Otter Creek is not meeting Montana's numeric water quality standard for iron ( $1,000 \mu\text{g/L}$ )
- Otter Creek is not fully supporting its designated use for aquatic life



CIRCULAR DEQ-7

MONTANA NUMERIC WATER QUALITY STANDARDS



October 2012

Prepared by:  
Water Quality Planning Bureau, Water Quality Standards Section  
Montana Department of Environmental Quality  
Water Quality Planning Bureau  
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# Project Results

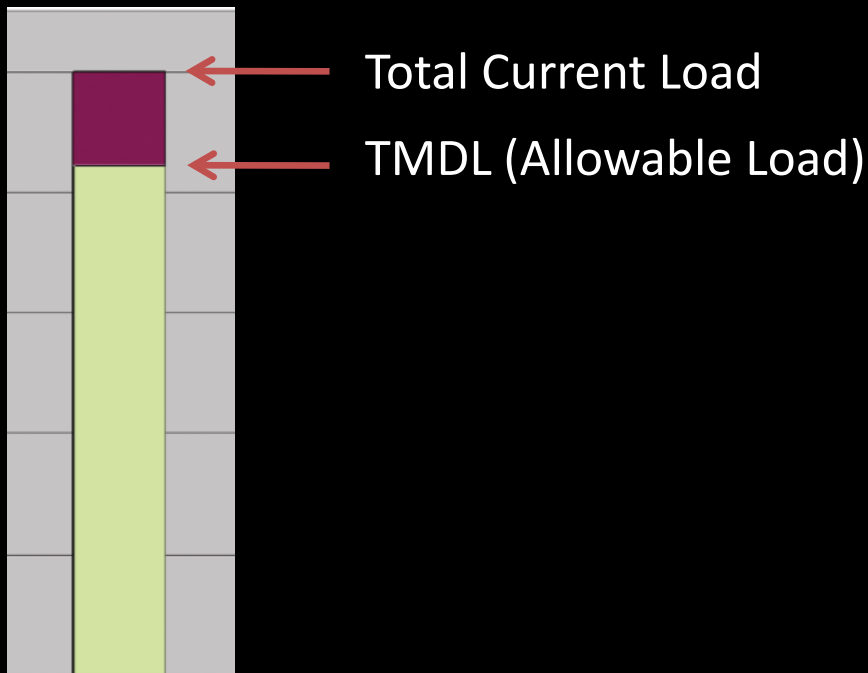
- Existing iron loading is predominately linked to natural sources throughout the Otter Creek watershed
- For existing sources: limited opportunities to improve overall health of Otter Creek via iron load reductions
- For new/future sources: goal is to protect the health of Otter Creek via discharge limits





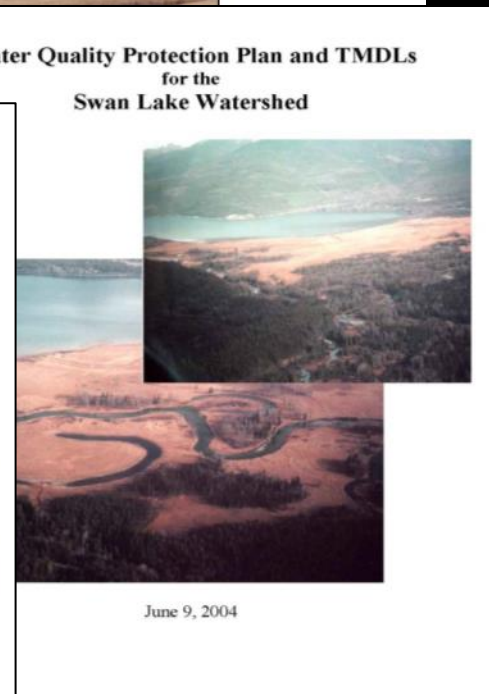
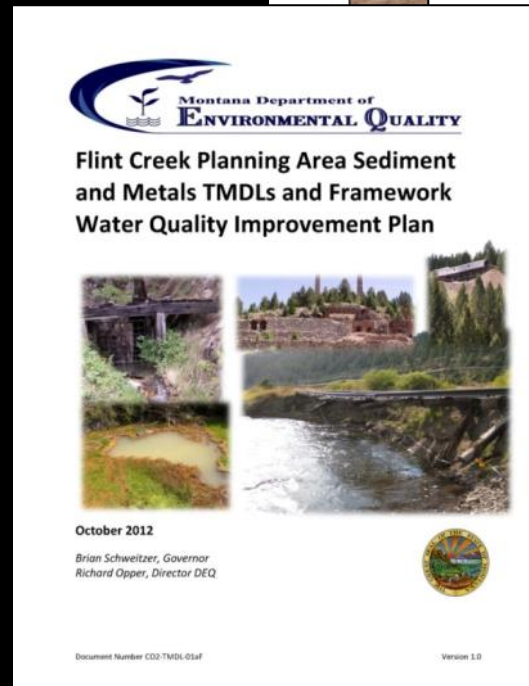
# What is a TMDL?

**T**otal **M**aximum **D**aily **L**oad is the amount of a pollutant that a waterbody (stream or lake) can receive from all sources and still meet water quality standards

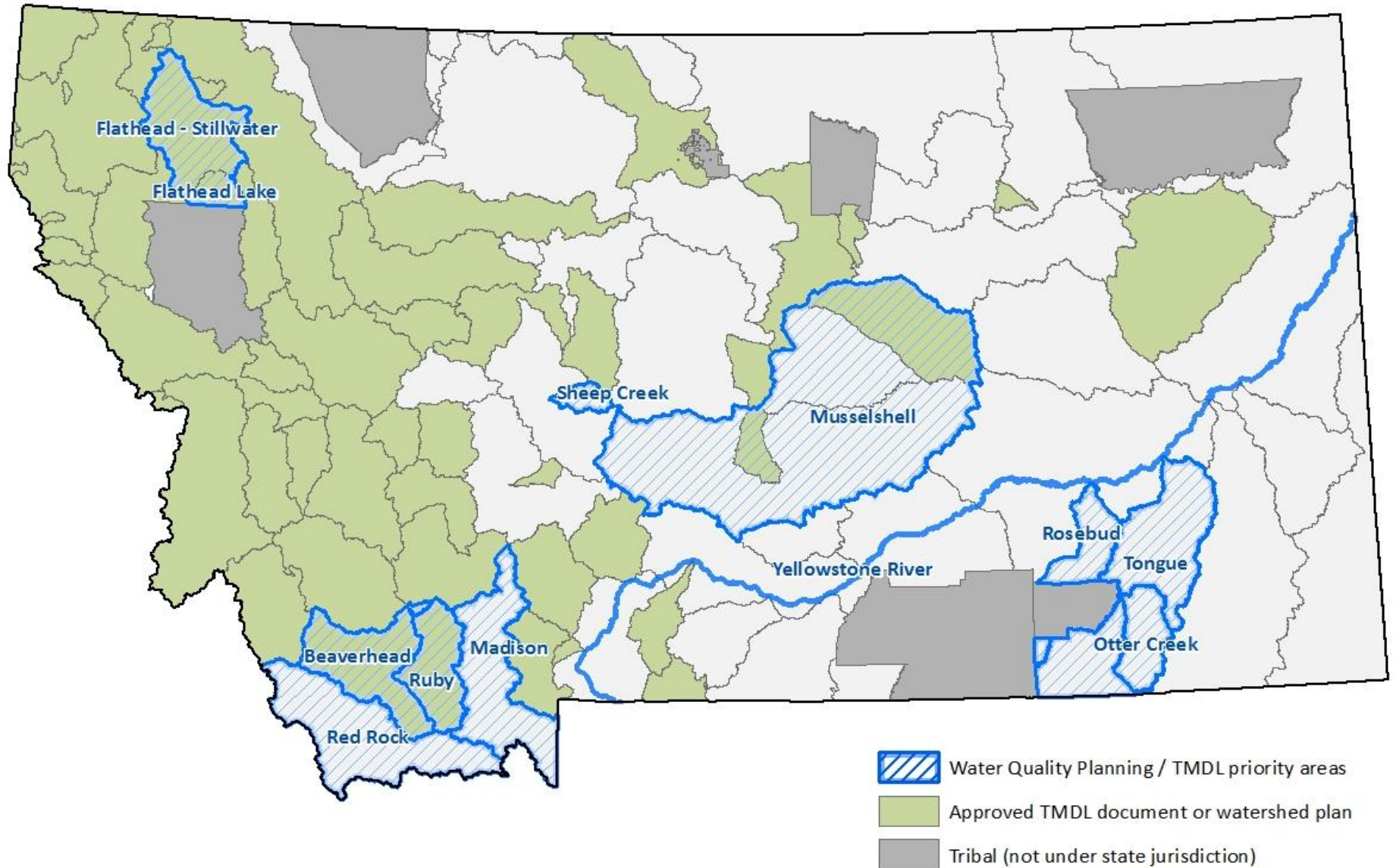


# Montana TMDL Program History

- More than 1,300 approved TMDLs (1998 – present)
- Over 70 TMDL documents completed
- Most apply to watersheds in western Montana



# Montana TMDL Project Areas





# How Does A TMDL Affect Someone?

- Does not create or impose new regulations
  - Can help implement existing regulations, mainly for permitted surface water discharges
- Voluntary for the majority of other activities, including agriculture
  - Application of water quality improvement practices is a landowner's decision



# Otter Creek Iron TMDL Development

# Iron TMDL: Basic Information

- Only one TMDL is developed for Otter Creek; the TMDL is for Iron (a type of metal pollutant)
- Addresses existing iron sources in the watershed
- Also addresses one future source: permitted surface water discharge for Otter Creek Coal (linked to permit application received by DEQ)
  - This is unique to TMDLs developed in Montana
- Does not include salinity information/analyses

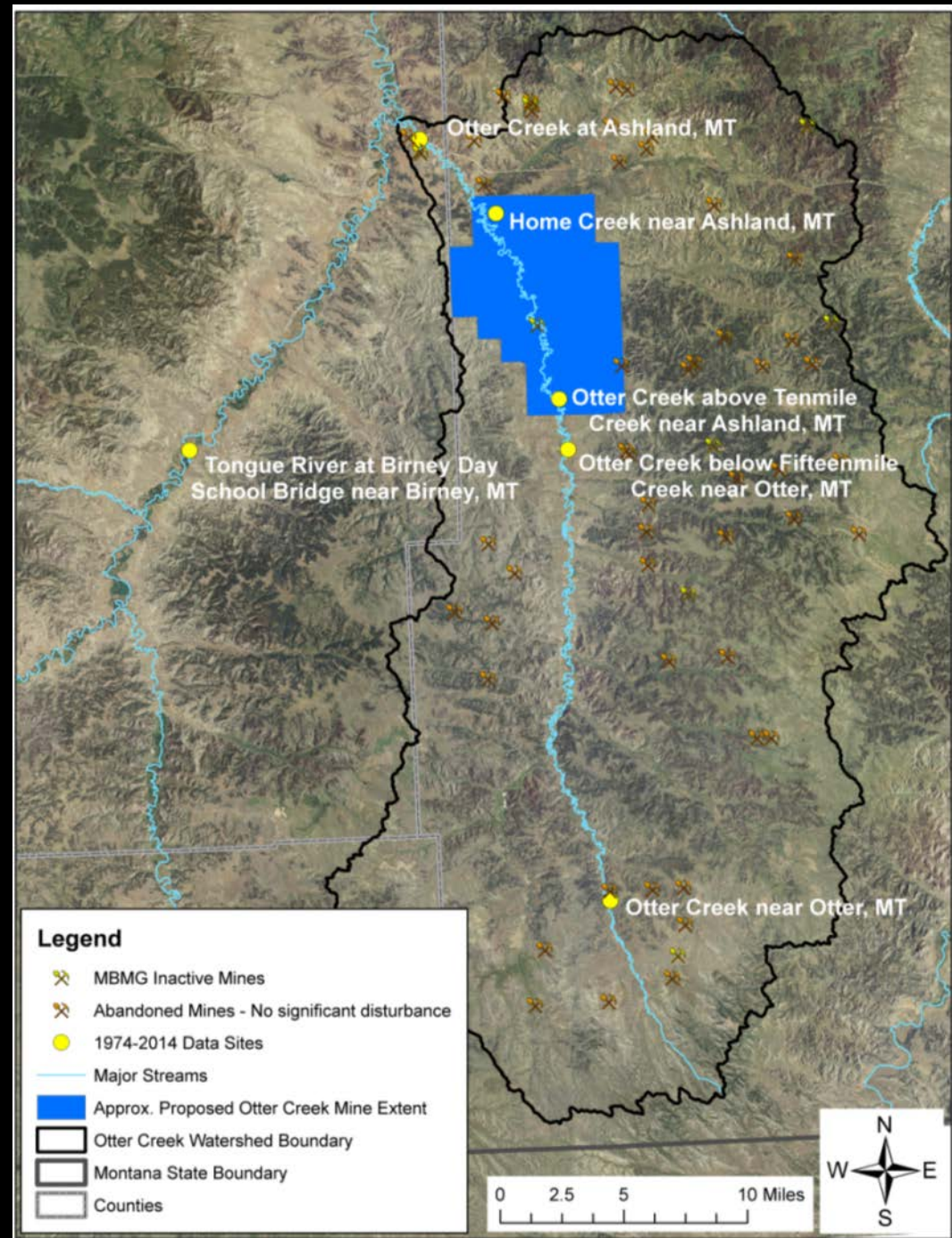


# Iron TMDL: Basic Approach

Major iron TMDL development steps include:

- Characterizing Otter Creek's water quality
- Determining sources of iron loading to Otter Creek
- Defining the allowable loading rate (TMDL)
- Defining the TMDL allocations

# Characterizing Existing Water Quality: Sample Locations



# Characterizing Existing Water Quality: General Approach

- Compare representative water quality samples from Otter Creek to the iron water quality standard of 1,000  $\mu\text{g/L}$
- If more than 10% of the samples from Otter Creek are above 1,000  $\mu\text{g/L}$  then it is impaired for iron
- This 1,000  $\mu\text{g/L}$  upper limit value is also used as the TMDL target





# Characterizing Existing Water Quality: Conclusions

- Otter Creek does not meet the numeric standard since about 30% of samples are above 1,000  $\mu\text{g/L}$ 
  - Aquatic life is not supported at the desired level
- Results are consistent through time (1970's to present)
- Water quality generally improves in an upstream direction

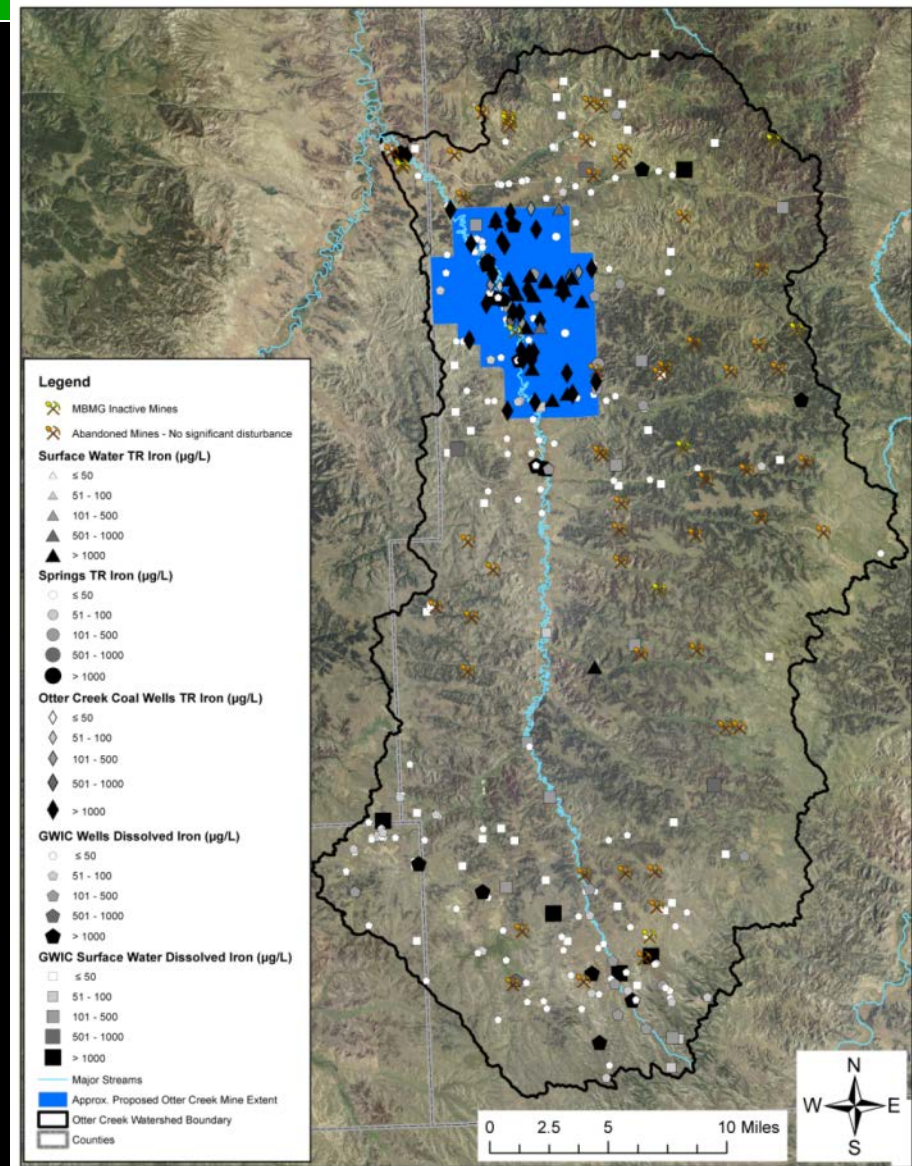


Otter Creek

# Determining Sources of Iron Loading to Otter Creek: Sample Locations & Potential Sources

Surface Water, Springs  
and Ground Water  
Sample Locations

Sources include mining  
activity, agriculture  
(crops, grazing), and  
natural loading (including  
fires)



# Determining Sources of Iron Loading to Otter Creek: Data Observations

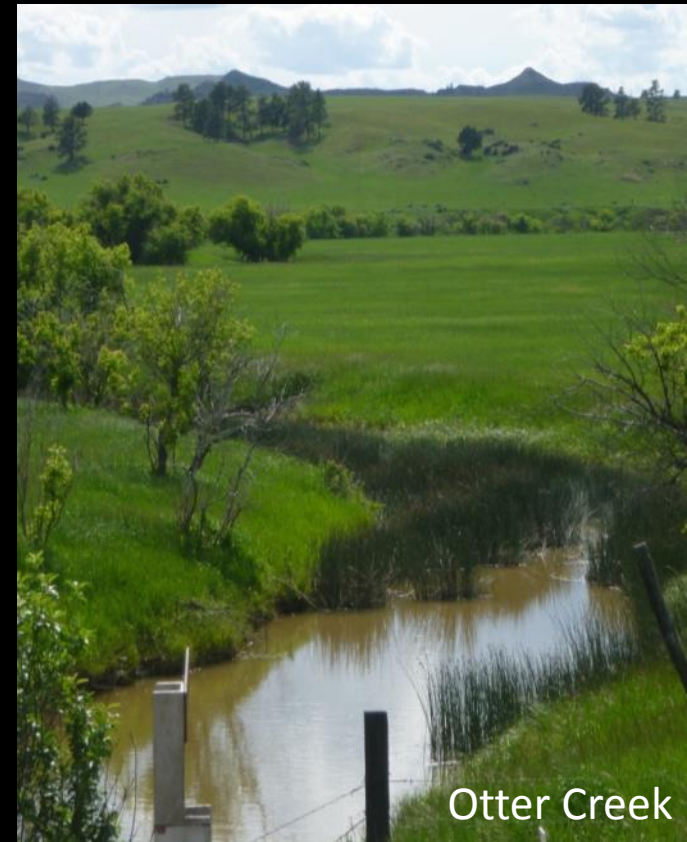
- Elevated iron concentrations occur during both higher flow conditions (generally greater erosion potential) and lower flow conditions (generally greater ground water influence)
- Many high iron values occur in the vicinity of the proposed coal mine site (potential coal seam influence)
- Similar iron water quality conditions observed throughout the Tongue River watershed and other watersheds in Montana





# Determining Sources of Iron Loading to Otter Creek: Land Use Linkages

- **Mining:** minimal disturbance in watershed, all inactive; no clear link to high iron values
- **Agriculture:** occurs throughout the watershed, no clear link to high iron values
- **Sediment Erosion Model (2007):** minimal contribution from human-caused sources





# Determining Sources of Iron Loading to Otter Creek: Conclusion

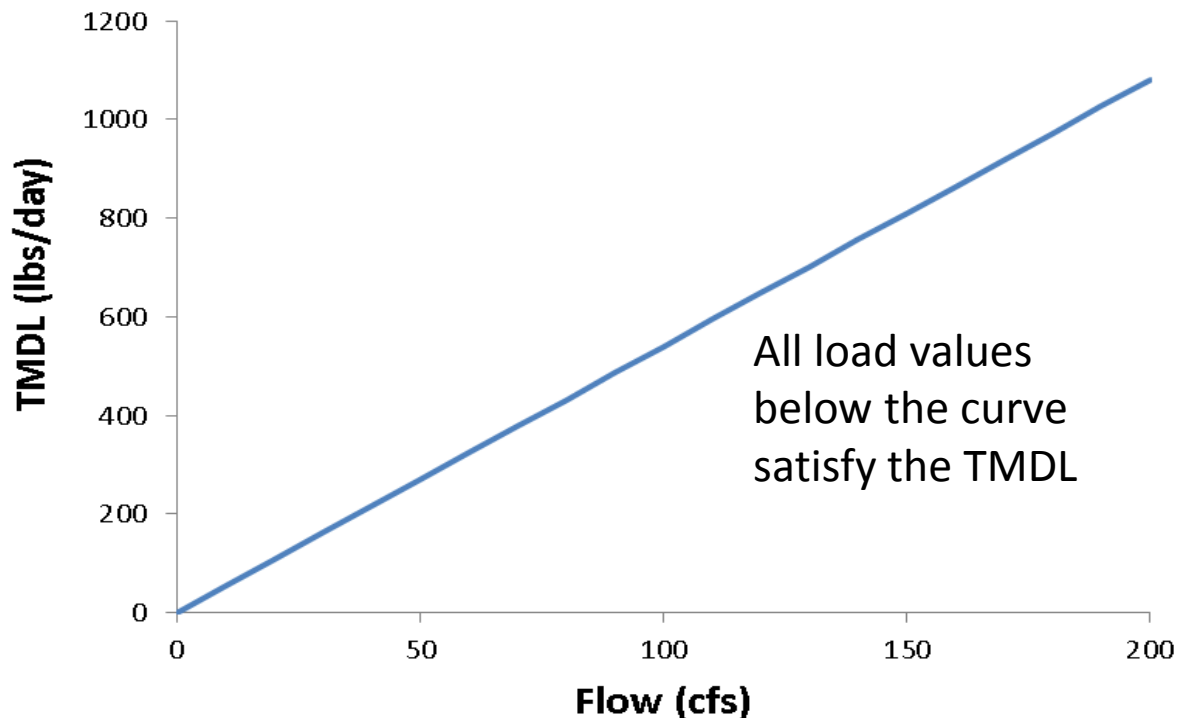
Elevated iron levels are predominately due to a combination of natural background loading from erosion and naturally high iron levels in ground water



Otter Creek Watershed

# Defining the Allowable Loading Rate (Total Maximum Daily Load)

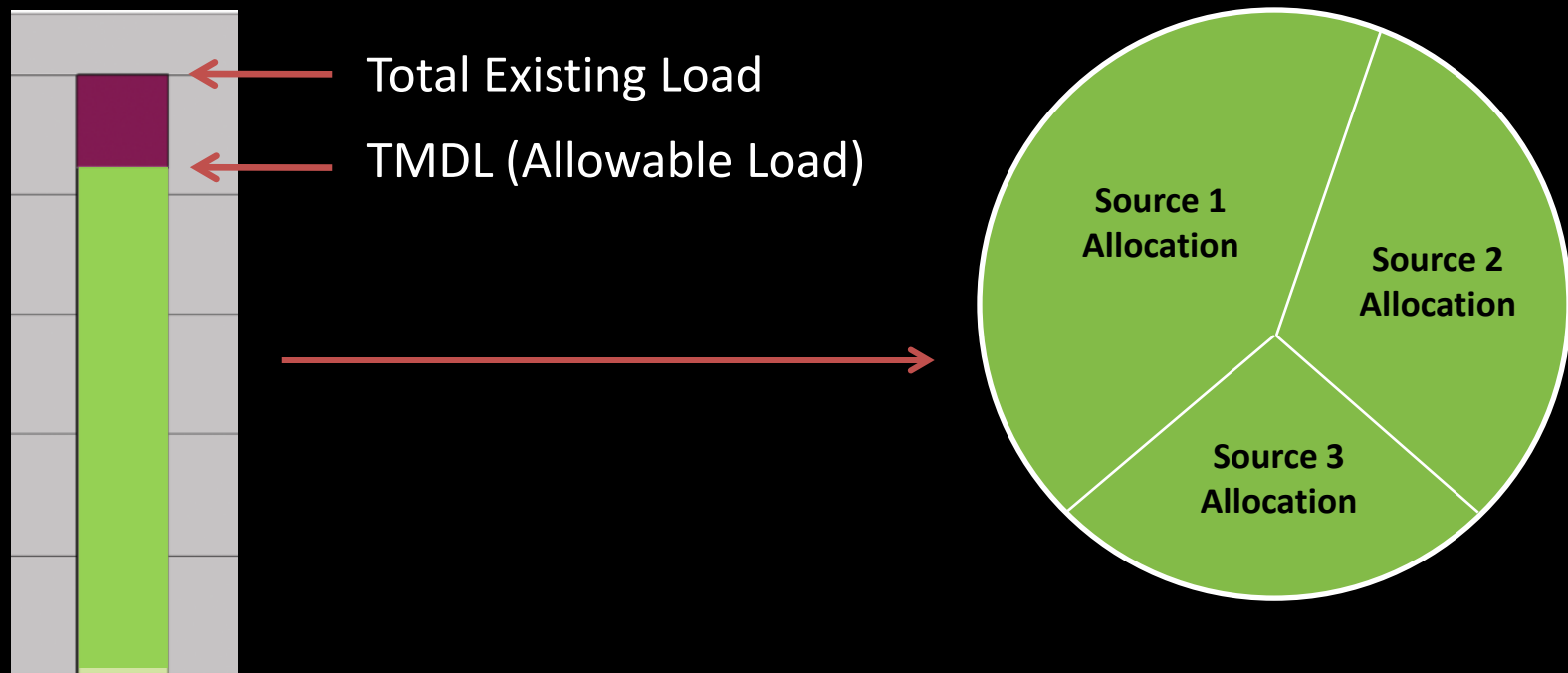
$$\text{TMDL (lb/day)} = (\text{Otter Creek flow}) \times (\text{target concentration})$$



Note: not meeting the target 30% of the time equates to not meeting the TMDL 30% of the time

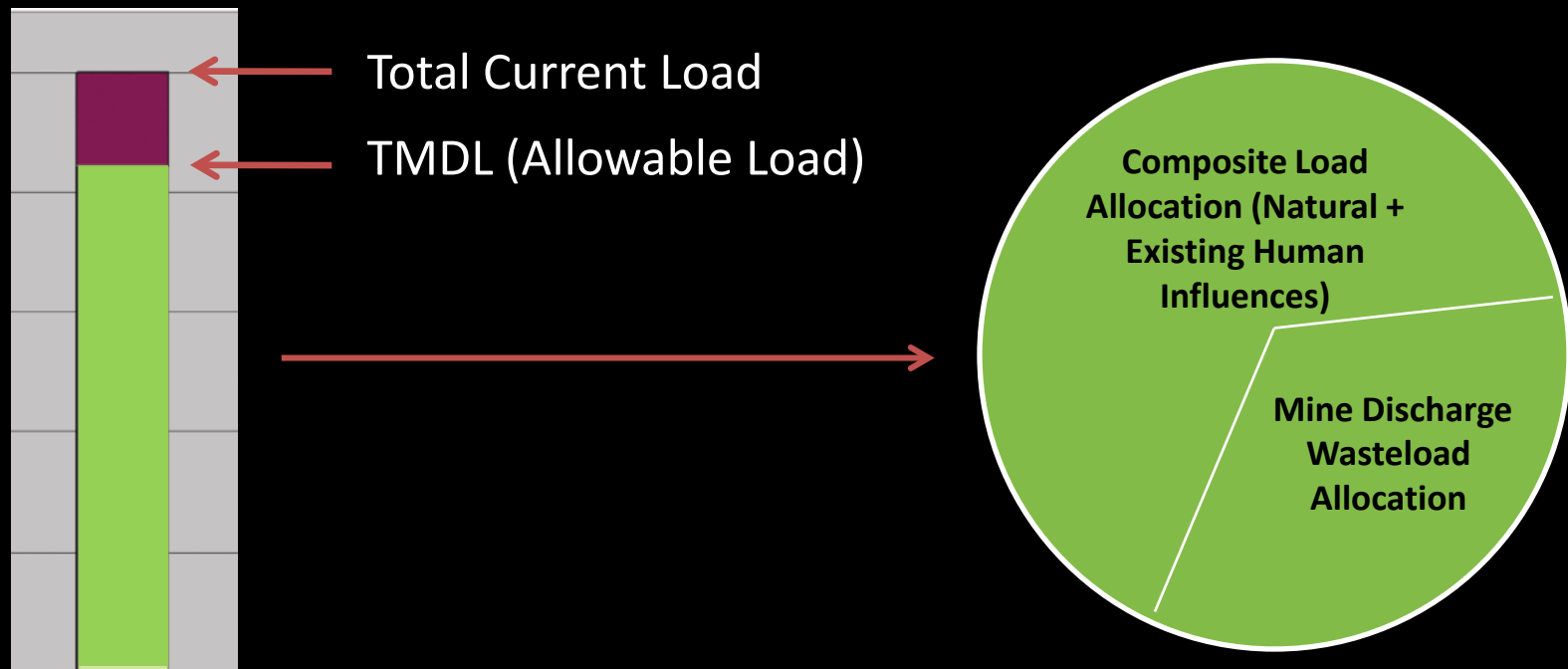
# Defining the TMDL Allocations: Conceptual Diagram

For a stream, the below diagram represents a given flow since the allowable load increases with flow



# Defining the TMDL Allocations: Otter Creek Iron Approach

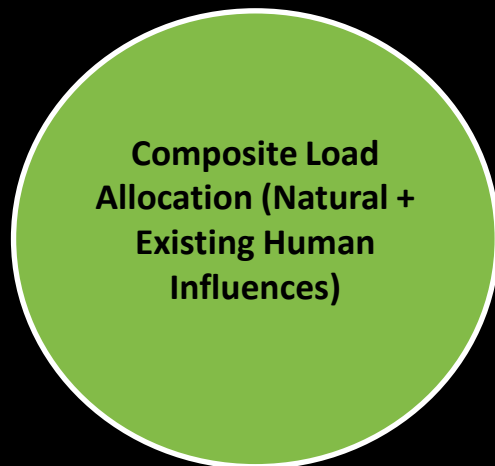
- All existing loading is combined into one composite load allocation
- An iron wasteload allocation is provided for the proposed mine discharge; applies only below the discharge location



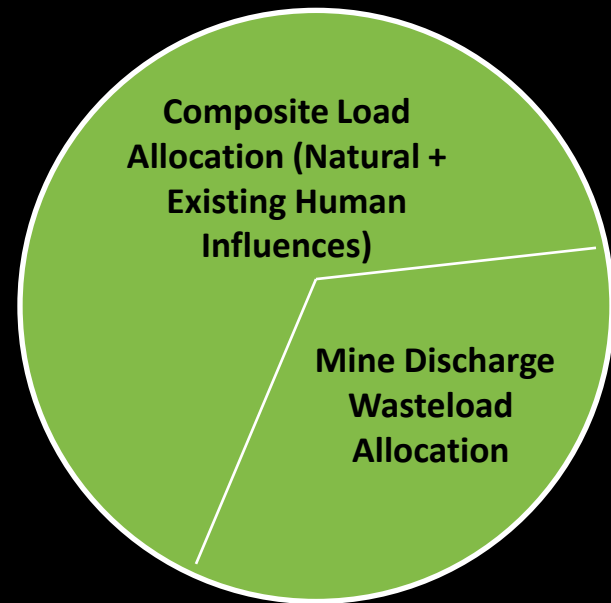


# Defining the TMDL Allocations: Above vs. Below the Discharge Location

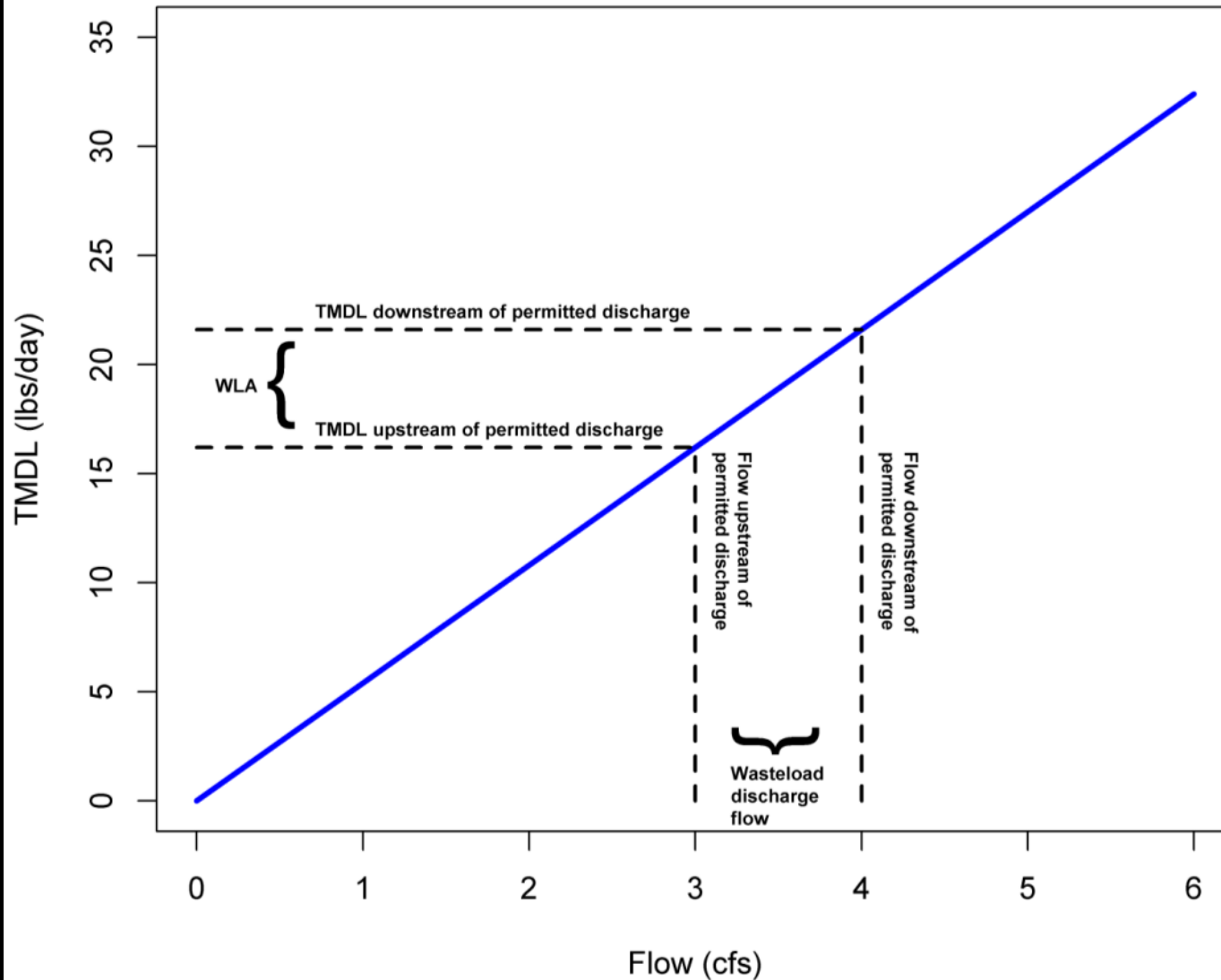
Above the  
Discharge



Below the  
Discharge



# Defining the TMDL Allocations: Wasteload Allocation Details



# Defining the Wasteload Allocation: Basic Considerations

Discharges with iron concentrations  $\leq 1000 \mu\text{g/L}$ :

- Will not increase the frequency of downstream samples in Otter Creek above  $1000 \mu\text{g/L}$
- Will not increase the magnitude of iron concentrations in Otter Creek when above  $1000 \mu\text{g/L}$
- Will not cause or contribute to water quality impairment downstream of the discharge (Otter Creek & Tongue River)

# Coffee & Sugar Concentration Analogy





# Wasteload Allocation Goal

Goal is to help protect the designated uses that could be impacted by elevated iron levels in Otter Creek & the Tongue River



# Achieving the Iron TMDL

- Water quality is naturally limited
- The mine discharge limit is set to avoid any additional impacts to aquatic life
- Implementing water quality improvement practices to help reduce erosion and protect stream banks can help protect the aquatic life use



Otter Creek

# TMDL Linkage to Other DEQ Actions for the Proposed Otter Creek Coal Mine

Iron TMDL information will inform these separate processes regarding the proposed Otter Creek Coal mine:

- The surface water discharge permit
  - must set limits consistent with the TMDL wasteload allocation
  - only addresses one of many potential pollutants within the proposed Otter Creek Coal mine surface water discharge permit
- The coal mine permit issued by DEQ coal program
- The environmental impact statement

# Public Comment Information and Next Steps



# Otter Creek TMDL Document Sections

1. Introduction & Regulatory Context
  2. Otter Creek Watershed Description
  3. Water Quality Standards
  4. General TMDL Development Information
  5. Iron TMDL Details
  6. Public Participation
- Appendix A (maps), Appendix B (data)

# How to Submit Comments

**Public Comment Period Ends 5:00 p.m.  
Friday, October 30, 2015**

- Comment forms at this meeting
- Via DEQ Website:  
<http://svc.mt.gov/deq/publiccomment/>
- Mail to DEQ
- Email: [CStaten@mt.gov](mailto:CStaten@mt.gov)
- Fax: 406-444-6836



# After Close of Public Comment Period

- Review received comments & make final document edits
- Prepare responses to public comments
  - Responses will be included in final document
- Final document submittal to EPA expected before end of year
- EPA approval & final document publication



# Questions & Discussion

